

### Claims

1. A magnetic recording medium comprising a substrate and a SiO<sub>2</sub>-containing magnetic layer comprising grains, wherein the magnetic layer has SiO<sub>2</sub> between the grains.
2. The medium of claim 1, wherein the SiO<sub>2</sub>-containing magnetic layer is deposited on the substrate by sputter deposition in a chamber containing a gas under vacuum, wherein the gas contains substantially no oxygen.
3. The medium of claim 2, wherein no oxygen is intentionally introduced into the gas.
4. The medium of claim 1, wherein the SiO<sub>2</sub>-containing magnetic layer contains about 6-10% SiO<sub>2</sub>.
5. The medium of claim 4, wherein the medium has a higher SMNR than that of another medium having a same structure as that of the medium except the SiO<sub>2</sub>-containing magnetic layer of the another medium contains about 4% SiO<sub>2</sub> and is sputter deposited in a chamber containing a gas mixture of argon and oxygen under vacuum.
6. The medium of claim 2, wherein the gas is substantially pure argon.

7. The medium of claim 1, wherein the SiO<sub>2</sub>-containing magnetic layer is CoCrPt-SiO<sub>2</sub>.
8. The medium of claim 1, wherein the SiO<sub>2</sub>-containing magnetic layer comprises 0-15 atomic percent Cr, 10-35 atomic percent Pt, 0.01-12 atomic percent SiO<sub>2</sub>, and 35-90 atomic percent Co.
9. The medium of claim 1, wherein SiO<sub>2</sub> of the SiO<sub>2</sub>-containing magnetic layer improves a property of the SiO<sub>2</sub>-containing magnetic layer by segregation and decoupling of the grains.
10. The medium of claim 1, further comprising an additional magnetic layer and optionally a non-magnetic spacer between the SiO<sub>2</sub>-containing magnetic layer and the additional magnetic layer.
11. A method of manufacturing a magnetic recording medium comprising obtaining a substrate and depositing a SiO<sub>2</sub>-containing magnetic layer comprising grains, wherein the magnetic layer has SiO<sub>2</sub> between the grains.
12. The method of claim 11, wherein the SiO<sub>2</sub>-containing magnetic layer is deposited on the substrate by sputter deposition in a chamber containing a gas under vacuum, wherein the gas contains substantially no oxygen.

13. The method of claim 12, wherein no oxygen is intentionally introduced into the gas.

14. The method of claim 11, wherein the SiO<sub>2</sub>-containing magnetic layer contains about 6-10% SiO<sub>2</sub>.

15. The method of claim 12, wherein the gas is substantially pure argon.

16. The method of claim 11, wherein the SiO<sub>2</sub>-containing magnetic layer is CoCrPt-SiO<sub>2</sub>.

17. The method of claim 11, wherein the SiO<sub>2</sub>-containing magnetic layer comprises 0-15 atomic percent Cr, 10-35 atomic percent Pt, 0.01-12 atomic percent SiO<sub>2</sub>, and 35-90 atomic percent Co.

18. The method of claim 11, wherein SiO<sub>2</sub> of the SiO<sub>2</sub>-containing magnetic layer improves a performance of the SiO<sub>2</sub>-containing magnetic layer by segregation and de-coupling of the grains.

19. The method of claim 11, further comprising an additional magnetic layer and optionally a non-magnetic spacer between the SiO<sub>2</sub>-containing magnetic layer and the additional magnetic layer.

20      A magnetic recording medium comprising a substrate and a  $\text{SiO}_2$ -containing magnetic means comprising grains, wherein the magnetic means has  $\text{SiO}_2$  between the grains.